CLAIMS

1. A hydraulic working machine provided with:

a double-acting hydraulic cylinder arranged for extension or contraction by pressure oil, which is delivered from a main pump, to drive a working element,

a directional control valve for controlling a flow of pressure oil to be fed from said main pump to said hydraulic cylinder, and

a control unit for performing a change-over control of said directional control valve, characterized in that said hydraulic working machine is provided with:

a jack-up selector valve for being changed over in flow-line when a feed pressure to said hydraulic cylinder has reached a predetermined pressure, and

a flow-line changing means for changing a flow-line for pressure oil, which is to be fed from said main pump to a meter-in port of said directional control valve, from an open side to a closed side in response to a change-over control of said selector valve,

wherein, when the holding pressure on said hydraulic cylinder is equal to or higher than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a first selected position to change over said flow-line changing means to the closed side such that pressure oil delivered from said main pump is not fed to a non-holding

pressure feeding side of said hydraulic cylinder, and

when the holding pressure on said hydraulic cylinder is lower than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a second selected position to change over said flow-line changing means to the open side such that pressure oil delivered from said main pump is fed to a holding pressure side of said hydraulic cylinder via said directional control valve.

2. A hydraulic working machine provided with a main pump, a working element, a double-acting hydraulic cylinder arranged for extension or contraction by pressure oil, which is delivered from a main pump, to drive said working element, a directional control valve for controlling flows of pressure oil to be fed from said main pump to a bottom chamber and rod chamber of said hydraulic cylinder, and a control unit for performing a change-over control of said directional control valve, characterized in that said hydraulic working machine is provided with:

a jack-up selector valve for being changed over when a bottom pressure on said hydraulic cylinder has reached a predetermined pressure, and

a flow-line changing means for changing a flow-line for pressure oil, which is to be fed from said main pump to a meter-in port of said directional control valve, from an open side to a closed side in response to a change-over control of said jack-up

selector valve,

wherein, when the bottom pressure on said hydraulic cylinder is equal to or higher than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a first selected position to change over said flow-line changing means to the closed side such that pressure oil delivered from said main pump is not fed to said rod chamber of said hydraulic cylinder, and

when the bottom pressure on said hydraulic cylinder is lower than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a second selected position to change over said flow-line changing means to the open side such that pressure oil delivered from said main pump is fed to said rod chamber of said hydraulic cylinder via said directional control valve.

3. A hydraulic working machine provided with a first and second main pumps, a first track unit for being driven by pressure oil delivered from said first main pump, a second track unit for being driven by pressure oil delivered from said second main pump, a first directional control valve for controlling a flow of pressure oil to be fed from said first main pump to said first track unit, a second directional control valve for controlling a flow of pressure oil to be fed from said second main pump to said second track unit, a working element, a double-acting hydraulic cylinder arranged for extension or contraction by

pressure oil, which is delivered from said first and second main pumps, to drive said working element, a third directional control valve for controlling flows of pressure oil to be fed from said first main pump to a bottom chamber and rod chamber of said hydraulic cylinder, a fourth directional control valve for controlling flows of pressure oil to be fed from said second main pump to said bottom chamber and rod chamber of said hydraulic cylinder, a first control unit for performing change-over controls of said first and second directional control valves, and a second control unit for performing change-over controls of said third and fourth directional control valves, characterized in that said hydraulic working machine is provided with:

a jack-up selector valve for being changed over when a bottom pressure on said hydraulic cylinder has reached a predetermined pressure, and

a flow-line changing means for changing a flow-line for pressure oil, which is to be fed from said first main pump to a meter-in port of said third directional control valve, from an open side to a closed side in response to a change-over control of said jack-up selector valve,

wherein, when the bottom pressure on said hydraulic cylinder is equal to or higher than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a first selected position to change over said

flow-line changing means to the closed side such that pressure oil delivered from said first and second main pumps is not fed to said rod chamber of said hydraulic cylinder, and

when the bottom pressure on said hydraulic cylinder is lower than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a second selected position to change over said flow-line changing means to the open side such that pressure oil delivered from said first and second main pumps is fed to said rod chamber of said hydraulic cylinder via said third and fourth directional control valves.

4. A hydraulic working machine according to claim 2 or 3, wherein said hydraulic working machine is further provided with a regeneration circuit for regenerating a portion of meter-out oil, which is discharged from said bottom chamber of said hydraulic cylinder, into meter-in oil to be fed to said rod chamber of said hydraulic cylinder.

5. A hydraulic working machine according to any one of claims 1-3, wherein as said jack-up selector valve, said hydraulic working machine is provided with a hydraulically-piloted selector valve.

6. A hydraulic working machine provided with a variable displacement hydraulic pump as a main pump, a swash angle control means for controlling a displacement of said variable displacement hydraulic pump, at least one working element, at least one actuator arranged for extension or contraction by

pressure oil, which is delivered from said variable displacement hydraulic pump, to drive said working element, a directional control valve for controlling a flow of pressure oil to be fed from said variable displacement hydraulic pump to said hydraulic cylinder, a pilot control unit for controlling a stroke of said directional control valve, and a swash angle instruction means for outputting a swash angle control signal to said swash angle control means in response to a signal from said pilot control unit, characterized in that said hydraulic working machine is provided with:

a jack-up selector valve for being changed over when a holding pressure on said actuator has reached a predetermined pressure, and

a flow-line changing means for changing a flow-line for pressure oil, which is to be fed from said variable displacement hydraulic pump to a meter-in port of said directional control valve, from an open side to a closed side in response to a change-over control of said jack-up selector valve,

wherein, when the holding pressure on said actuator is equal to or higher than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a first selected position to change over said flow-line changing means to the closed side such that pressure oil to be fed from said variable displacement hydraulic pump to said actuator is cut off and the displacement of said variable

displacement hydraulic pump is decreasingly controlled, and

when the holding pressure on said actuator is lower than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a second selected position to change over said flow-line changing means to the open side such that pressure oil delivered from said variable displacement hydraulic pump is fed to said actuator via said directional control valve and the displacement of said variable displacement hydraulic pump is increasingly controlled by said swash angle instruction means.

7. A hydraulic working machine provided with a first and second variable displacement hydraulic pumps as main pumps, a first and second swash angle control means for independently controlling displacements of said first and second variable displacement hydraulic pumps, respectively, a first track unit for being driven by pressure oil delivered from said first variable displacement hydraulic pump, a second track unit for being driven by pressure oil delivered from said second variable displacement hydraulic pump, a first directional control valve for controlling a flow of pressure oil to be fed from said first variable displacement hydraulic pump to said first track unit, a second directional control valve for controlling a flow of pressure oil to be fed from said second variable displacement hydraulic pump to said second track unit, at least one working element, at least one actuator arranged for extension or

contraction by pressure oil, which is delivered from said first and second variable displacement hydraulic pumps, to drive said working element, a third directional control valve for controlling a flow of pressure oil to be fed from said first variable displacement hydraulic pump to said actuator, a fourth directional control valve for controlling a flow of pressure oil to be fed from said second variable displacement hydraulic pump to said actuator, a pilot control unit for performing change-over controls of said first and second directional control valves, and a swash angle instruction means for outputting a swash angle control signal to said swash angle control means in response to a signal from said pilot control unit, characterized in that said hydraulic working machine is provided with:

a jack-up selector valve for being changed over when a holding pressure on said actuator has reached a predetermined pressure, and

a flow-line changing means for changing a flow-line for pressure oil, which is to be fed from said first variable displacement hydraulic pump to a meter-in port of said third directional control valve, from an open side to a closed side in response to a change-over control of said jack-up selector valve,

wherein, when the holding pressure on said actuator is equal to or higher than the predetermined pressure upon lowering

said working element, said jack-up selector valve is changed over to a first selected position to change over said flow-line changing means to the closed side such that pressure oil to be fed from said first and second variable displacement hydraulic pumps to said actuator is cut off and the displacements of said first and second variable displacement hydraulic pumps are decreasingly controlled, and

when the holding pressure on said actuator is lower than the predetermined pressure upon lowering said working element, said jack-up selector valve is changed over to a second selected position to change over said flow-line changing means to the open side such that pressure oil delivered from said first and second variable displacement hydraulic pumps is fed to said actuator via said third and fourth directional control valves and the displacements of said first and second variable displacement hydraulic pumps are increasingly controlled by said swash angle instruction means.

8. A hydraulic working machine according to any one of claims 1, 2 and 6, wherein said flow-line changing means comprises:

a flow control valve connected on an upstream side of said directional control valve to said meter-in port of said directional control valve such that said flow control valve is changed over to a closed position when said jack-up selector valve has been changed over to the first selected position and

is changed over to an open position when said jack-up selector valve has been changed over to the second selected position, and

a center bypass selector valve connected on a downstream side of said directional control valve to a center bypass port of said directional control valve such that said center bypass selector valve is changed over to an open position when said jack-up selector valve has been changed over to the first selected position and is changed over to a closed position when said jack-up selector valve has been changed over to the second selected position.

9. A hydraulic working machine according to claim 3 or 7, wherein said flow-line changing means comprises:

a flow control valve connected on an upstream side of said third directional control valve to said meter-in port of said third directional control valve such that said flow control valve is changed over to a closed position when said jack-up selector valve has been changed over to the first selected position and is changed over to an open position when said jack-up selector valve has been changed over to the second selected position, and

a center bypass selector valve connected on a downstream side of said third directional control valve to a center bypass port of said third directional control valve such that said center bypass selector valve is changed over to an open position when

said jack-up selector valve has been changed over to the first selected position and is changed over to a closed position when said jack-up selector valve has been changed over to the second selected position.

10. A hydraulic working machine according to any one of claims 6-9, wherein as said jack-up selector valve, said hydraulic working machine is provided with a hydraulically-piloted selector valve, and said hydraulically-piloted selector valve is provided at a pilot port thereof with a restrictor.

11. A hydraulic working machine according to any one of claims 1-10, wherein said hydraulic working machine is further provided with:

a solenoid-operated selector valve for performing a change-over control of said jack-up selector valve,

a pressure sensing means for sensing a pressure value in said bottom chamber of said hydraulic cylinder, and

an electric control means for operating said solenoid-operated selector valve on a basis of a pressure sensed by said pressure sensing means.

12. A hydraulic working machine according to claim 6 or 7, wherein said swash angle instruction means comprises a combination of plural shuttle valves which select a higher one of a predetermined group of control signal pressures among control signal pressures produced by said pilot control unit.

13. A hydraulic working machine according to claim 6 or 8, wherein said lowered working element is a boom, and said actuator is a hydraulic cylinder for said boom.

14. A hydraulic working machine according to claim 12, wherein said hydraulic working machine is provided with a regeneration circuit for regenerating a portion of meter-out oil, which is discharged from a bottom chamber of said hydraulic cylinder for said boom, into meter-in oil to be fed to a rod chamber of said hydraulic cylinder for said boom.